



## What is the name of the babassu? A note on the confusing use of scientific names for this important palm tree

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### Abstract

Various scientific names are usually found for the babassu in current literature: mainly *Orbignya phalerata* and *Attalea speciosa*, but also *O. speciosa* and *O. martiana*, among others. This multiplicity of names leads to great confusion in the scientific community causing mistakes to be successively propagated. This note aims to clarify the problem, reviewing the species nomenclature history since the first description by Martius, in 1826, and reporting the successive name changes which occurred. Consequences of the lumping of four closely related genera, of recent phylogenetic studies and of the last changes in palm classification on the species nomenclature are also briefly discussed. In addition, searching results on scientific names at the main Plant Name Indexes are presented here. As a conclusion, we recommend the adoption of *Attalea speciosa* Mart ex. Spreng as the most suitable name for the babassu and highlight that a broad taxonomic review of the *Attalea* group is necessary.

**Key words:** *Attalea speciosa*, Arecaceae, babassu, *Orbignya phalerata*, taxonomy.

### Resumo

Na literatura científica atual são encontrados artigos que utilizam diferentes nomes científicos para o babaçu, principalmente *Orbignya phalerata* e *Attalea speciosa*, mas também *O. speciosa*, *O. martiana*, entre outros. Esta multiplicidade de nomes ocasiona uma grande confusão na comunidade científica que permite a propagação sucessiva de erros. Este artigo de opinião objetiva esclarecer aspectos deste problema, revisando a história da nomenclatura da espécie, desde a primeira descrição por Martius, em 1826, e evidenciando as sucessivas mudanças de nome que ocorreram. São também brevemente discutidas as consequências da fusão dos quatro gêneros relacionados, de recentes trabalhos de filogenia e das últimas mudanças em classificação de palmeiras para a nomenclatura da espécie. Adicionalmente, os resultados de buscas em Índices de Nomes de Plantas são apresentados. Como conclusão, recomendamos a adoção do nome *Attalea speciosa* Mart ex. Spreng como o mais adequado para o babaçu e frisamos a forte necessidade de uma ampla revisão taxonômica do grupo.

**Palavras-chave:** *Attalea speciosa*, Arecaceae, babaçu, *Orbignya phalerata*, taxonomia.

### Introduction

Babassu is a remarkable palm tree with economic and sociocultural importance (Mesquita 2008), especially in the state of Maranhão. It is associated with “quebradeiras de coco”, traditional women who break the coconut to sell the rich-oil seeds. Data records from 2011 indicate that more than 102,000 tons of babassu seeds were commercialized in Brazil (IBGE 2013). The information above leaves no doubt about the species in question. However, the scientific literature displays discordant information in relation to its scientific name.

Palm taxonomy and classification has shown to be a great challenge. Large fruits, inflorescences and leaves make it difficult to prepare and preserve exsiccatae, resulting in low representation in herbaria (Tomlinson 1979; Balick *et al.* 1982; Henderson 1995). In addition, the great variability in morphology, habit and fruit size within species, as well as the occurrence of interspecific hybridization, common among palm trees, further complicates the delimitation of species (Henderson 1995).

According to Pintaud (2008), the taxonomy of the genus to which belongs the babassu is

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hampered not only by its large size, but also by the seasonal phenology and functional dioecy, which hinder the collection of full material. As a result, many extremely abundant species were described only recently and are still little known. Thus, in the history of babassu nomenclature, descriptions based on incomplete samples are common. Furthermore, the species has been described more than once, which took too long to be realized. Such problems lead to successive nomenclatural changes.

Moreover, other problem is the adoption of different genus concepts by different taxonomists (Pintaud 2008). The babassu is considered as either *Orbignya* or *Attalea*, depending on each author, a fact discussed here afterwards. Lack of consensus indicates that a comprehensive taxonomic review is necessary (Zona 2002; Pintaud 2008), possibly in monographic style.

All the issues above lead to the use of various scientific names for the babassu in recent literature: *A. speciosa* Mart. ex Spreng. (Barot *et al.* 2005; Pintaud 2008; Lorenzi *et al.* 2010), *O. phalerata* Mart. (Albiero *et al.* 2011), *O. speciosa* (Mart. ex Spreng.) Barb. Rodr. (Ferreira 2005; Gama *et al.* 2007; Soler *et al.* 2007; Vidotto *et al.* 2007; Reis and Conceição 2010), *O. martiana* Barb. Rodr. (Pavlak *et al.* 2007; Farias *et al.* 2011) and *O. oleaginosa* (Silva-Filho *et al.* 2007). It is also common to find papers which avoid using the specific epithet, referring to the babassu as *Orbignya* sp. (Castro *et al.* 2002; Lima *et al.* 2006; Silva & Firmo 2008).

Despite the different cited scientific names, all scientific papers above refer to the same species, as indicated by the geographical distribution, economic importance and/or other aspects mentioned in the text. Other palm trees are also popularly known as babassu (according to Lorenzi *et al.* 2010: *Attalea brasiliensis* Glassman, *A. brejinhoensis* (Glassman) Zona, *A. compta* Mart., *A. pindobassu* Bondar and *A. vitrivir* Zona). However, these species have restricted and/or disjunct distribution range and less economic importance, hence, not being confused with the species in focus.

With so many scientific names, the vast majority of researchers studying the babassu is relatively unwilling to dedicate deep study to taxonomy papers and search for bibliographical updates, adopting the most commonly cited names in publications and propagating mistakes.

In this text, we present a review of the nomenclatural history of this species. In order to allow a better understanding of the issue, we organize information that is spread out in various publications and, finally, suggest the adoption of a given binomial.

#### History of the babassu nomenclature

Four independent descriptions in the nineteenth century start babassu nomenclature: the first description was made by Martius in 1826 as *Attalea speciosa* (Glassman 1999). The same author described a specimen in Bolivia in 1844 as *Orbignya phalerata*. Drude described *O. lydiae* Drude in Flora Brasiliensis in 1881, based on a cultivated material in the Rio de Janeiro Botanical Garden; and Barbosa Rodrigues published *O. speciosa* in 1891 (Glassman 1999).

In 1898, Barbosa Rodrigues argued that the description of Martius for *Attalea speciosa* was based on an incomplete collection (without flowers), describing again the species as *Orbignya martiana* (Anderson & Balick 1988; Glassman 1999; Pintaud 2008). Later, in 1903, Barbosa Rodrigues considered that *O. martiana* was the same as *O. speciosa*, which he had described before (Glassman 1999).

To solve distinction problems between this species and *O. cohune* (Mart.) Dahlgren ex Standl., Burret made another description in 1932, synonymizing *O. speciosa*, *O. martiana* and *A. speciosa* under *O. barbosiana* Burret (Glassman 1999). The other species mentioned (*O. phalerata* and *O. lydiae*) would be considered synonyms later. All of this confusion caused various scientific names to be used by the scientific community throughout the past two centuries.

More recently, in 1988, Anderson & Balick studied the taxonomy of the babassu and closely related species. Initially, the authors considered the name *O. martiana* valid, claiming that the oldest combination (*O. speciosa*) was invalid. However, comparing the illustrations and descriptions to *O. phalerata*, described from Bolivia in 1844, by Martius, the authors concluded that they were the same species, which presents broad geographic distribution. They concluded that the first proposed name, *O. phalerata*, would be more suitable to designate the babassu.

The name *O. phalerata* was widely adopted by the scientific community, being

currently used. However, there is a discussion about the validity of the genus *Orbignya*, as presented below.

The babassu belongs to the subtribe Attaleinae (Dransfield & Uhl 1986). Several genera compose this subtribe, and Dransfield *et al.* (2005) presented the latest circumscription.

A group of related genera, known as “*Attalea Alliance*” (Glassman 1977), can be recognized within Attaleinae: *Attalea* (Humboldt *et al.* 1816), *Maximiliana* (Martius 1826), *Orbignya* (Martius 1837), *Scheelea* (Karsten 1857), *Parascheelea* (Dugand 1940) and *Markleya* (Bondar 1957). Later taxonomic treatments considered *Parascheelea* and *Markleya* to be invalid (Dransfield & Uhl 1986). The Attaleinae genera are distinguished from each other by the morphology of the staminate flower (Glassman 1977), but intermediate flower types blur taxonomic boundaries (Wessels Boer 1965; Anderson & Balick 1988).

Wessels Boer (1965) suggested the lumping of all “*Attalea Alliance*” genera into a single genus (see Henderson & Balick 1991; Henderson 1995). In this case, the valid name for the group must be the first proposed, *Attalea* and the other genera should be considered a synonym. This suggestion has split the scientific community: while some authors agree with the proposition (Henderson & Balick 1991; Henderson 1995; Henderson *et al.* 1995), others preferred to keep the genera separated by considering the arguments to be unconvincing (Moore 1973; Dransfield & Uhl 1986; Glassman 1999).

According to Zona (2002), Henderson’s publication, *The Palms of the Amazon* (1995), and Glassman’s monograph about the subtribe Attaleinae (1999), are the only modern treatments of the subtribe. Glassman (1999) does not follow Boer’s ideas, but Henderson (1995) does. The first proposition of lumping is often incorrectly credited to Henderson, although the author stated that he was following Wessels Boer (Henderson & Balick 1991; Henderson 1995).

Assuming Wessels Boer’s (1965) proposition as valid, the correct combination would be *Attalea speciosa*, the name used in the first description by Martius in 1826. Nevertheless, following the Barbosa Rodrigues’ (1898) arguments, some authors considered this name invalid due to the fact that the description of Martius was based on incomplete material. For this reason, Zona (2002) proposed a new

name for the species: *Attalea glassmanii* Zona (the eighth proposed name for the babassu). Although correct, this new name was not well accepted by the scientific community. Authors such as Govaerts & Dransfield (2005) preferred to keep *A. speciosa* because of its traditional association to the species.

#### Recent publications and the advent of molecular biology

Dransfield *et al.* (2005), considering numerous studies, including many molecular analyzes, presented a new phylogenetic classification of Arecaceae. In this proposal, some clades emerged, some groups already established were split into different groups and some groups were collapsed. The authors compare the proposed classification to the *Genera Palmarum* list of genera (Uhl & Dransfield 1987). *Orbignya*, which was accepted on the latter, is considered as a synonym of *Attalea* by Dransfield *et al.* (2005).

Another publication of the same year, published by *Royal Botanic Gardens*, Kew, England (Govaerts & Dransfield 2005), lists the valid names of Arecaceae, also considering *Attalea speciosa* to be the correct name of the babassu.

Although Dransfield *et al.* (2005) admit that advances in Phylogenetics may lead to refinements and modifications to the proposed classification, they state that the foundations of the new classification are robust and are not going to suffer major changes. This publication was a preview of the new classification of palm trees published in the second edition of *Genera Palmarum* (Dransfield *et al.* 2008), the latest monograph published concerning the family. This book received the *Annual Literature Award of the Council on Botanical and Horticultural Libraries*. In *Genera Palmarum* (Dransfield *et al.* 2008) *Orbignya* is a synonym of *Attalea*.

Meerow *et al.* (2009) published a phylogenetic reconstruction of Attaleinae subtribe based on WRKY gene sequences. The “*Scheelea* group” appeared to be monophyletic, but the “*Orbignya* group” appeared to be paraphyletic. This demonstrates that the traditional circumscription of *Orbignya* may be artificial. The genus *Attalea* in its broad concept (encompassing the “groups” *Scheelea*, *Orbignya* and *Attalea*) appeared to be monophyletic, corroborating Wessels Boer’s proposition (1965).

**Table 1** – Searching results on the species' name at the main Plant Name Index maintained by Taxonomy and Systematics research institutions.

Index	Institution	Name Status <sup>a</sup>		Notes
		<i>Attalea speciosa</i>	<i>Orbignya phalerata</i>	
The Plant List	The Royal Botanic Gardens (Kew) and Missouri Botanical Garden	Accepted	Synonym	
Tropicos	Missouri Botanical Garden	Legitimate	Synonym	
World Check List	The Royal Botanic Gardens (Kew)	Accepted	Synonym	
Germplasm Resources Information Network (GRIN)	USDA (USA)		Synonym	<i>Orbignya phalerata</i> "no accessions in National Plant Germoplasm System under this name"
International Plant Name Index (INPI)	The Royal Botanic Gardens (Kew), The Harvard University Herbaria, and the Australian National Herbarium	-	-	No status is indicated
List of Species of the Brazilian Flora	Rio de Janeiro Botanical Garden	Accepted and Correct Name	Synonym, Legitimate, but incorrect name	
The Palm Web	International Palm Society; Royal Botanic Gardens (Kew), the Botanischer Garten und Botanisches Museum (Berlin-Dahlem), and Aarhus University		Synonym	

<sup>a</sup> According to "The Plant List", accepted name "is the name which should be used to refer to the species (or to a subspecies, variety or forma)" and a "Synonym is an alternative name which has been used to refer to a species (or to a subspecies, variety or forma) but which The Plant List does not consider to be the currently accepted name. The decision to assign a status of synonym to a name record is based upon a taxonomic opinion recorded in the cited data source."

### The babassu in plant nomenclature indexes

Indexes or lists of scientific names maintained by research institutions in plant taxonomy are reliable because they are developed and updated by renowned specialists. Table 1 shows searching results for the two main names used for the babassu (*Orbignya phalerata* and *Attalea speciosa*) in some of these indexes. *Attalea* is an accepted name (and *Orbignya* is a synonym) in all consulted indexes, except one, which does not present status of the names.

"The Palm Web" index does not present "*Orbignya*" in its list. It is necessary to search the directory of "misapplied names" to find it. "Misapplied names" are those which, for some reason, are wrong or no longer used. By clicking on "*Orbignya phalerata*", the user is automatically redirected to *Attalea speciosa* webpage, showing that *O. phalerata* is considered a synonym.

"The Palm Web" is a constantly updated product of the *European Distributed Institute of Taxonomy* (EDIT), a project that aims to facilitate access to taxonomic data. It is supported by the



Botanical Institutes of Kew Gardens (England), the Botanischer Garten und Botanisches Museum (Germany) and the Aarhus University (Denmark). On the website (<<http://www.palmweb.org/>>), it is possible to read the following note about the adoption of *Attalea*: “Glassman (1999) recognises four genera, *Attalea*, *Scheelea*, *Orbignya* and *Maximiliana*. These four genera were also recognised in the first edition of *Genera Palmarum*. As the palms have become better known in the field and more herbarium material has accumulated, the characters of the staminate flowers used to differentiate the genera seem increasingly unreliable. Intermediate conditions occur (which Glassman [1999] attributes to intergeneric hybridisation) and the form of the staminate flower seems not be correlated with any other varying characters. Henderson (1995) and Henderson *et al.* (1995) included all genera in *Attalea*, arguing convincingly that the previously recognised genera are untenable. This broad generic approach is followed here.” However, it must be highlighted that Henderson’s publications are not monographic and the expression “arguing convincingly” used by “The Palm Web” is questionable.

### Conclusion

Even if the name *Orbignya phalerata* is considered valid, its use is not indicated, seeing that recent botanical literature about Arecaceae and the plant names indexes embraces the genera lumping into *Attalea* proposed by Wessel Boer. *Genera Palmarum* (Dransfield *et al.* 2008), in which *Orbignya* is a synonymy of *Attalea*, brings a robust and well-grounded classification. To reject it, its foundations must be challenged through convincing scientific publication. Hence, we recommend the adoption of *Attalea speciosa* Mart. ex Spreng for the babassu. Nevertheless, the simple analysis of the nomenclatural history of this species clearly indicates the necessity of a broad taxonomic review of the group.

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